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E D I T O R I A L

THE RELATIONSHIP OF THE U. S. P. AND THE N. F.

IN this issue there is an announcement by the National Formulary Committee listing a large number of proposed deletions for the N. F. VIII as well as a number of suggestions for additions. The deletions proposed constitute a very healthy sign for American Pharmacy, since for years the National Formulary has been a repository for old drugs of a bygone era in therapeutics. Our contention that because they were used they merited recognition was not altogether a sound argument and probably many pharmacists who, themselves, projected this explanation were only trying to rationalize an accepted weakness.

At the present time the work of the National Formulary Committee is under the sound and capable leadership of Dr. Justin L. Powers and this courageous step relative to scope is exactly what one might expect of his scientific outlook as well as his sincerity of purpose. His task, however, is not easy for a number of reasons one of which is might be well to review.

The Pharmacopœia has for years maintained the position that it has a prior right in selecting drugs and preparations for official recognition. This opinion, from time to time, has been condemned and on a few occasions there have been some rather bitter contentions stemming from this point. The position taken by the Pharmacopœia does seem, however, to be sound in principle since it was the *first* book of standards and it, furthermore, represents the cooperative effort of all the health sciences and not solely that of organized pharmacy. The medical men on the subcommittee on scope should have the unrestricted privilege of recognizing all substances of proven therapeutic value supplemented by those pharmaceutic necessities needed to manufacture the preparations of each of these so recognized.

In the past the Pharmacopœia has abused this privilege, even if not by intent, by permitting the National Formulary Committee to carry out long and tedious work in preparation for the recognition

of a new drug and then, by the simple expedient of taking it over, caused considerable chagrin on the part of those carrying out such work. There is today a recognition of this situation as well as a sincere effort to work in closer contact with the N. F. Committee.

The chief feature of objection to the conduct of the revision of the Pharmacopœia is that the subcommittee on scope does not rigidly apply its rule in deciding the scope of the Pharmacopœia. This may be because its membership is predominantly medical, resulting in too little concern for the success of an effort like the National Formulary which is chiefly pharmaceutical.

This difficulty could be bridged rather easily, since the Chairman of the Revision Committee is a pharmacist, and with quite proper regard for his profession he might point out a few of these problems. The subcommittee on scope of the Pharmacopœia should admit only those drugs of distinct therapeutic value and those which are needed in preparing U. S. P. preparations of these same drugs. The frequency with which a drug or preparation is prescribed should in no way influence the committee in its judgment. For example, codeine phosphate was recognized by the U. S. P. XII since it is the best codeine salt for general use but codeine sulfate was also recognized solely because of its extensive use. It has identical therapeutic qualities. Such a policy if pursued to an extreme would exclude from the National Formulary all drugs except those of dubious value which would be foolish as we shall see. Then, too, we have vehicles official, an entirely unjustifiable practice; volatile oils that are not used therapeutically, and other instances of poor functioning on the part of the scope subcommittee.

We in pharmacy agree to the right of priority on the part of the Pharmacopœia but we insist that the National Formulary is not without a cause and that it behooves those who are responsible for the Pharmacopœia to consider us with an honest desire to be mutually helpful. We have a Food and Drug Act which gives recognition to both U. S. P. and N. F. and our whole system of regulation is built upon this edifice. It is our opinion that by strengthening the National Formulary the Pharmacopœia also gains strength. We feel that the scope of the U. S. P. should be more clearly defined and that the N. F. should be thus improved and placed on that equal basis in importance and prestige that it rightfully deserves.

L. F. Tice.

SOME OF THE PRESENT AND FUTURE PROBLEMS OF PHARMACY † *

By W. P. Briggs, Lt.-Comdr., H-V(S), U. S. N. R.

IT has been suggested that I talk briefly about Naval medical services in the Pacific area. As a member of the "paragraph troupers of the chair-borne command," I am obviously not in a position to give you a first-hand picture of the magnificent work that is being done by medical officers and hospital corpsmen of the Navy in our battle areas. There is little I would be permitted to add to newspaper reports from which you have already learned that amazing results are being attained, and that the number of deaths from casualties has been reduced almost to the vanishing point by prompt medical attention and the application of new drugs and techniques. With your indulgence, therefore, I shall speak to you for a few moments about some general subjects in the world of Pharmacy, that I am sure have already received your attention, but which will require further study and deliberate action in the near future. I am moved to assume this somewhat presumptive position because during the two years that I have been in the Navy my duties have been largely of a non-pharmaceutical nature. This temporary separation has provided an opportunity to see objectively some problems that, through close association, might not have been so clearly defined. My work in the Bureau of Medicine and Surgery has been varied and interesting, but has not been limited to pharmaceutical matters. So far as possible I have tried to keep in touch with developments in pharmacy, and although I have undoubtedly fallen behind, I have found time to give some thought to a few of the more obvious problems of the present and future. If my brief remarks have any significance it will be because of this position in which I find myself.

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† Based on an address given on Alumni Day, June 27, 1944, at the Philadelphia College of Pharmacy and Science.

* The opinions expressed in this paper are those of the writer and do not necessarily represent the official views of the Navy Department.

Coming from Washington I enjoy a certain freedom with respect to the necessity for making my remarks pertinent. It is my privilege, as a bureaucrat, to speak in general and ambiguous terms and never be called to task for failing to reach a clearly crystallized point.

I have prepared these few notes in the form of memoranda. A memorandum is a widely used, ingenious device of some long-forgotten bureaucrat that has much to commend it. Anyone can prepare a memo on almost any subject at any time and send it to anyone, and thus I present my remarks to you in the form of memoranda.

"Memo" on the Changing Order in Pharmacy

Sir Henry Dale, speaking before the Pharmaceutical Society of Great Britain on the occasion of the award of the Hanbury Medal, said, "The old-fashioned dispensing of mixtures on individual prescriptions will doubtless linger for a time; but I think that we must regard it as inevitable that the preparation of the remedies required by a progressive therapeutics will eventually fall entirely into the hands of scientific, large-scale manufacturers, and that the role of the individual pharmacist in relation to them will become little more than an intelligent retail distribution of ready made and centrally standardized products. Your Society will be faced with the problem of deciding whether the same curriculum and standard of scientific qualification will be adequate for the one and relevant to the other of the two sections into which the calling of pharmacy seems destined thus to be cloven."

It occurs to me that Sir Henry has put into words what many of us have been thinking for some years past. I fear that, like the ostrich, many of us are guilty of burying our heads in the sand to avoid facing what we believe will be a catastrophe in this changing order of medical and pharmaceutical practice. There is no reason why pharmacy cannot adjust itself, to its advantage, to a new position in the post-war world if it will courageously face the realities of the inevitable. I have heard some of the most profound thinkers in American Pharmacy debate as to whether pharmacy can ever achieve complete recognition as a profession so long as it is practiced over the counters of a store or a shop. This American point of view and

the observations of our British friend seem to me to focus attention upon a common theme.

There seems to be a feeling that retail business is a vocation of which one must be ashamed. Napoleon disparagingly referred to the people of England as a nation of small shopkeepers, and yet this has not prevented the British people from occupying a preeminent position in world affairs, politically, socially and economically. Did you ever think of a banker as a man who followed a lowly path in life? Generally, I believe, bankers are socially catalogued with physicians, lawyers and statesmen. The banker is, in reality, a retail merchant dealing in the most earthly commodity, but doing so with a fine sense of proportion and dignity. The bank clerk is certainly comparable to any other clerk who sells a commodity. But when you pass from the bank clerk's window to the office of one of the vice-presidents to negotiate a loan or to purchase bonds or to get information about insurance, you sense without being told, that you are moving into a professional niche in that retail store which we call a bank.

For as long as I can remember, we have been pouring out our collective voices and using gallons of printers' ink to convince the public that pharmacy is a profession. We ask all who will listen to ignore the largest and most obvious part of the drug store as they see it in their daily life, and to consider the whole activity in the light of a small, sometimes hidden prescription department, or even the faraway research laboratory of a university or manufacturer. We ask them in effect not to see the flamboyant advertising—the colorful displays of cosmetics—the soda fountain, but to search out a shining light under a bushel, and weigh the whole as a professional activity on the basis of this important but relatively obscure unit.

The public's opinion of pharmacy is not very high, but this is a reflection of a confusion which we have allowed to develop. We have told them that the retail drug store is pharmacy. The public knows well that pharmacy is a profession, but they cannot be made to believe that the total activity of a retail drug store is professional. There is no more reason why they should believe this than that we should try to justify and defend so essential a community activity.

All of the criticism centers around the pharmacist's non-pharmaceutical activity, which shames us and makes us try to forget it and convince others that it is something unreal. Our mistake, as

I see it, is in trying to cover up a necessary and obvious economic aspect of the practice of pharmacy and thus place pharmacy in a defensive position. When a pharmacist has supplied every proper and essential professional service to the people whose health and welfare he has been licensed and privileged to protect, he discharges his professional responsibility to his community. His rights as a private citizen begin at this point, and he may elect, without loss of professional dignity, to supply any other legitimate service or commodity on the basis of personal economic necessity, public demand or community convenience. Physicians own and operate banks and apartment houses—lawyers sell insurance and real estate—ministers marry for better or for worse—members of Congress accept remuneration for speaking—teachers receive pay for their services as consultants—after fulfilling their primary public responsibility. Men in all professions engage in extraneous or "outside" activities for extra income—this is a part of the "American way." The fundamental difference between these professions and pharmacy is that the others assume it as a right, and pharmacy assumes it as a curse peculiar to itself. Because the others do not try to hide, or ask the public to overlook, these professionally unrelated activities, the public is hardly conscious that they are carried on. Certainly the public never questions the professional status of these groups because they engage in earning a living in their own way after their primary job has been done. The only curse on pharmacy is its deeply rooted inferiority complex and its defensive attitude. Both are curable in the public mind if we first cure them in our own minds.

It seems to me that pharmacy should stop trying to defend itself against a myth. No one challenges the professional status of the individual pharmacist who, as a professional individual, is the justification for the existence of the drug store. Even though the place in which he practices pharmacy may sell non-pharmaceutical items, he is, nevertheless, available to contribute his important part in the protection of the public health. To recognize the dual nature of the practice of pharmacy does not mean that pharmacy must accept a subordinate position in the public health field. On the contrary, it would strengthen the very proper claim to professional recognition of that part of pharmacy which is truly professional, in the same manner that the bank president's office receives respect in the midst of a retail shop called a bank.

I am confident that the prestige of pharmacy would be strengthened by taking the position that the drug store is a respectable, important part of every community's life—that it is a business that concerns itself with every citizen's health and welfare—and that one part of that business is the professional practice of pharmacy. I am reminded of the Biblical quotation, where Christ announces that "He must be about His Father's business," and I cannot be too concerned about any loss in professional standing in labelling a typical retail pharmacy a "business" when the word has been dignified by the Deity.

"Memo" on the Shortage of Pharmacists

There has been a great deal of rationalizing and theorizing about the current and growing shortage of pharmacists, and we are plowing some barren lands while a fertile field lies fallow.

If the shortage of pharmacists is real, and I assume that it is, there is little hope that the shortage can be alleviated by the methods of expediency proposed, in which women and "4-Fs" are encouraged to enter pharmacy. In all probability we can look forward to the return of the men now serving in the armed forces before any really significant number of women and "4-Fs" could be trained. If we are to be fair to the returning veterans and avoid a deep valley of unemployment, or see drug stores opening on every corner, we must carry on as other groups are, without filling "dikes with straw."

One of my first duties in the Navy was in connection with recruitment, particularly of men trained in fields allied to medicine, or with motivation for service in these fields who could be trained for Hospital Corps duty. Later on this assignment was expanded to include women. The first step in carrying out this assignment was the preparation of simple, informative literature, describing the purpose and duties of the Hospital Corps, and as nearly as possible, the routine work of a hospital corpsman. This copy was prepared as if the reader had not the slightest concept of the organization or work of this corps. In preparing pharmaceutical publicity material we fail sometimes to realize that the people who will read our propaganda

are those who have the least knowledge of the subject. This literature, designed to encourage men and women to enlist in the Hospital Corps of the Navy, was widely but carefully distributed. It was sent to the points where it could reasonably be expected to receive a welcome. We approached this distribution on a very elementary basis, somewhat in the manner of the moron who found the lost horse, by looking in the place he would be if he were a horse. Our efforts were amazingly successful. It is not to be expected that recruitment into pharmacy can have the same dramatic appeal as enlistment in the Navy in time of war, but if our sights are trained on really potential recruits for pharmacy, with the right kind of story, satisfying results can be expected.

One of the many things that I learned from this experience was the lack of basic information about the public health fields possessed by otherwise well-informed people. I have talked and corresponded with thousands of young men and women who held romantic ideas about medicine, pharmacy and allied fields, but whose specific knowledge of these activities was little short of appalling. Where strong motivation existed, even though only of a romantic nature, Navy training problems were greatly simplified. Motivation springs from information. Bernays and others confirm the distressing failure of pharmacy to tell its story, or, put another way, to create motivation toward pharmacy. I sincerely hope that our present public relations program will interpret, but not sell, pharmacy to one group in particular, in whom the creation of motivation for pharmacy should be easy. Thousands of young men and women will have experienced the stimulation of working in the Medical Departments of the Army and Navy. When the war is over we will have available to us, as if upon a silver platter, these already motivated recruits for pharmacy—sufficient to make up all of our shortages. In many of these young people there will be burning a spark that will lead them to pursue further training in pharmacy and allied fields at the earliest opportunity. It should be possible to reach these young pepole with a message about pharmacy toward the end of the war. If our timing is correct, our story clear and our colleges ready, I confidently believe that this temporarily acute shortage will be brought to a happy ending upon a sound and permanent basis rather than upon the unstable foundation of expediency.

"Memo" on Standards of Registration

Much concern is being expressed about the possible demands of enlisted personnel now in the Medical Departments of the Army and Navy who, it is believed, may seek licensure to practice pharmacy as a result of their military training and service. The training of enlisted personnel of the Medical Department of the Navy is well-organized, and probably this is also true in the Army, and in both instances is supplemented by extensive experience. Neither the training nor experience is limited to a single professional field, but the total background developed may warrant some credit toward civilian educational requirements. In my present position I do not feel that I should discuss the question of civilian educational credits for this service training, but in passing I would offer the observation that this critical problem should not be arbitrarily answered on the basis of prejudice, misinformation or wishful thinking.

In the course of my duties I have had occasion to deal with problems of professional training, experience requirements and State Board licensing regulations in several of the fields allied to medicine. There are a number of states which recognize Navy training courses, plus duty in the Hospital Corps, as satisfying the requirements to qualify for registration as a nurse. In some states Navy training and experience is accepted as qualifications for civilian practice as clinical laboratory technician, dental hygienist or physical therapist. In no state, to my knowledge, is Navy service accepted, in lieu of college training and apprenticeship, as meeting the requirements for the civilian practice of pharmacy. The Navy has not offered a special course in pharmacy for nearly two years, and the very limited amount of pharmacy, formerly included in the elementary course for all enlisted personnel in the Hospital Corps, was discontinued shortly after the beginning of the present war. While the title of Pharmacist's Mate is suggestive of professional qualification in pharmacy, as has been explained repeatedly, it does not mean that a person holding this rating has been trained, or is qualified, in pharmacy under civilian standards.

If veterans do claim the right to practice pharmacy, because they were pharmacist's mates or filled comparable billets in the Army, it seems to me that we have a very simple and effective answer to that

claim. The fact that recognition is granted by nursing and certain other allied professions for Navy, and possibly Army, training in these fields, should serve to negatively establish the complete inadequacy of the same service training for registration in pharmacy.

In summarizing these two related memos, I do not believe that we will be deluged by large numbers of "ninety-day wonders" from the military services, clamoring for veterans' rights and preference to enter pharmacy by the back door. I do believe that we will have available to us, if we rise to the occasion, a fine group of physically fit young men and women who will have been inspired to enter professional life as a direct outgrowth of their war experiences. We can turn away the dangerous, even if entirely mythical, hoards who would chisel their way into pharmacy. The issue I raise is to conserve our strength by not fighting windmills, but by directing thinking and planning into the realistic and fertile field of the armed forces for our future personnel requirements.

You will recall that I emphasized at the outset that I was not required, as a citizen of Washington, to supply definite answers, and that my responsibility ceased when I had created confusion. I have a profound dislike for all after-dinner speakers, and I am sure that they are only retained as a necessary evil out of deference to our former traditionally heavy dinners. Their sole justifiable purpose was to provide a period of relaxation for the diners. There is one particular species of after-dinner speaker that I dislike more heartily than all others. He is the man who insists upon bringing issues before you and takes advantage of the courtesy of his audience to present critical problems altogether foreign to the spirit of the gathering. I have so presumed upon you, not through malice or disregard of elementary courtesy, but because the faculty and alumni of this college have, for more than a century, led the way in pharmaceutical thinking. Even during an evening set aside for pleasant reunions you are gathering your strength to meet the course of future events.

THE DUAL ROLE OF QUININE IN THE AMERICAS

By Earl N. Bressman*

OF the many sudden twists and turns in world economy resulting from this war, one of the most interesting is the revival in the Americas of cinchona, the source of quinine. Cinchona has a romantic history dating back more than 400 years to its discovery in Peru as the "fever" tree whose bark, when ground to powder, has miraculous effect in curing malaria. Now global war imparts new meaning to the curative powers of quinine. As the experience of American soldiers at Bataan in the Philippines has shown, malaria can be as effective as bullets in weakening an army. The "fever" tree which Spaniards found in Peru more than 400 years ago means health and life to thousands of men fighting in malaria-infested areas.

And, by a curious chain of events, the revival of cinchona in the New World has come to be linked closely with the return of another native of the American tropics—the Hevea rubber tree. On rubber, too, the outcome of this global war depends heavily. Mechanized warfare rolls on rubber tires. Rubber enters into war equipment in a multitude of ways. And the magic of the chemical laboratory, in producing a synthetic substitute for nature's product, has not succeeded yet in entirely crowding out natural rubber. On the contrary, natural rubber still is required in substantial quantities, not to mention the undecided long-range battle between the natural and the synthetic product on the point of cost.

Now the revival of both rubber and quinine for large-scale commercial development in the tropical Americas coincides. Nature thoughtfully put within easy reach of the American tropics a remedy for the worst scourge of the rubber-producing country—malaria. The Americas need quinine in order to increase production of rubber. The greatest potential source of natural rubber for the United States, at least in the immediate future, is South America's vast Amazon basin. And expansion of rubber collection in this sparsely inhabited area is primarily a matter of increasing rubber-tapping forces. Transportation, food supply and disease problems all turn on the human factor in Amazon development. One of the first requirements arising out of the development of Amazon rubber after Pearl Harbor was

*Director, Inter-American Institute of Agricultural Sciences.

the need for anti-malarial drugs. Rubber development in the Americas, in fact, has resulted in additional demand for quinine overshadowed only by the requirements of the fighting men in the South Pacific, Africa and other tropical and sub-tropical climates.

Global war, fought in the heat of the equator as well as the icy grip of the Arctic, has emphasized the value of quinine to man. It has shown the Americas—as nothing ever did before—why they should establish firmly in this hemisphere a quinine-producing industry, certainly large enough to supply the home needs of the American republics. Latin America, particularly, requires anti-malarial drugs. Inter-American cooperation in the development of hemisphere resources finds a peculiarly appropriate project in the re-establishment of quinine in South and Central America on a firm and lasting basis. An abundant and low-cost supply of quinine can become a blessing to the American peoples, yielding results beyond the commercial value of cinchona as a cash-income crop.

Commercially, the importance of rubber far outweighs that of quinine. In value, quinine ordinarily represents only a fraction of the hundreds of millions of dollars the Americas formerly spent for rubber in the Netherlands East Indies and Malaya. And, as in rubber, the Americas had come to rely almost entirely on the Far East for quinine. With the help of scientific improvement of the cinchona plant, the Netherlands East Indies had wrested the market of quinine from Latin America.

What this meant to the peoples of the Americas, as a life and death matter, now is evident. The cinchona plantations of the Netherlands East Indies have fallen into enemy hands. The disadvantages of over-concentration of production in one place are clear. There is also the question, which existed before Japanese control of the Netherlands Indies, as to whether more competition was desirable in the world market, to lower the cost of quinine. A soundly organized plantation industry in the Americas, many felt, would help reduce quinine prices to meet one of the essential drug needs of the Americas. As with rubber, we can see now that in becoming almost entirely dependent for quinine supplies upon sources outside the Western Hemisphere we were taking a long risk—a risk which comes high in terms of human life and happiness.

The new development of a cinchona industry in Latin America, therefore, holds unusual interest. Perhaps the production of cinchona

bark as a source of quinine for some time won't make an industry with annual returns of much more than $1,000,000. Rubber, on the other hand, could return American growers many times that amount, once it has become intrenched as an efficient plantation industry. Fibers, vegetable oils, tropical hardwoods also tower above quinine in commercial significance. It is the human aspects—the medical value of quinine to malaria-ridden areas—which imparts special meaning to the development of an American cinchona industry.

Cinchona has a double role to play in the development of the American tropics. As a cash crop, it will add to the income and buying power of Latin America. From the southern part of the United States all the way south into the temperate zone of South America, quinine has a market. There is no doubt that it enters readily into inter-American trade.

But more important in the long run is the contribution quinine can make to the economic development of the American tropics. One of the major obstacles to this development is disease, particularly malaria. Recognition of the disease factor has been given in the organization of the inter-American health and sanitation program. This program, recommended by the Rio de Janeiro conference of American foreign ministers, is proceeding in eighteen of the other American republics in cooperation with the United States to support economic projects. Low-cost quinine can be a great boon to the tropical and sub-tropical areas of the Western Hemisphere in aiding the development of their abundant resources for mutually beneficial inter-American trade. One way to get low-cost quinine for the American people, I am convinced, is to foster the cinchona industry in South and Central America, based on scientific improvement of plant species and efficient plantation organization.

What scientific culture can do in the improvement of plant species is illustrated by the history of cinchona and its migration to the Far East. For more than 300 years after the Spaniards found it in Peru, cinchona bark was gathered mostly from wild trees on the slopes of the Andes, in Colombia, Ecuador, Bolivia, as well as Peru. Then, with the increasing scarcity of the bark and appreciation of its medical value, the Netherlands and British governments became interested in establishing cinchona plantations in their Asiatic colonies. Seeds from South America were sent to the Far East. A hunt started for superior types of cinchona. The winner in this hunt was

Charles Ledger, an Englishman who had lived in Peru and Bolivia for 20 years. He obtained seeds of a superior strain in 1865. Transplanted to Java, these seeds produced trees whose bark had a higher quinine content than any grown previously. These became the basis for the profitable cinchona plantation industry of the Netherlands East Indies. The strain now is well-known as cinchona ledgeriana, after its originator.

And now unfolds another chapter in the romantic story of cinchona. By a fortunate incident of this war, the Americas opportunely have a stock of high quality ledgeriana seedlings for the quinine industry rising in Central and South America. Just before the fall of Bataan, Colonel Arthur F. Fischer, now liaison officer of the War Department with the United States Foreign Economic Administration, escaped in a Flying Fortress from the Philippines with 2,000,000 of the ledgeriana type of cinchona seeds. These seeds were brought to Washington, planted temporarily in the United States government plant station at Glendale, Maryland. From there seedlings are being distributed to the other American republics to aid cinchona development. As this notable experiment shows, plants can be grown successfully from seeds for distribution to nurseries and plantations. Several hundred thousand of the high quality seedlings have been distributed. Among the recipients are Peru, Brazil, Mexico, Guatemala, Colombia, El Salvador, Nicaragua. Recently arrangements were made for the planting of about 100,000 of the seedlings by the Inter-American Institute of Agricultural Sciences at Turrialba, Costa Rica. The Institute plans to devote considerable attention to the improvement of cinchona toward the objective of establishing the industry in Latin America.

Nurseries and experiment stations in Latin America are engaged in what undoubtedly is the most extensive attempt yet made to start a cinchona plantation industry in the Western Hemisphere. Spasmodic efforts to give the plantation industry a commercial footing in Latin America have been made before. Plantations were started years ago in Bolivia, Colombia, Ecuador and Guatemala. More than 50 years ago President Justo Rufino Barrios of Guatemala planted thousands of seedlings on a plantation known as "El Porvenir" in northwest Guatemala. Here the cinchona trees, growing at high elevation, did exceedingly well. This seems to be the only place where cinchona adapted itself naturally to the environment.

Seeds from the trees grew readily as they fell to the ground. But this plantation turned to the growing of coffee. Now, however, the cinchona operations are being revived. "El Porvenir" is the largest cinchona plantation in Latin America, with prospect that it will supply a considerable part of the hemisphere's quinine needs. The plantation is being developed for larger production through the cooperation of Guatemala and the United States Foreign Economic Administration. Meanwhile, immediate quinine needs are being met in part by increased collection of cinchona bark from wild trees on the slopes of the Andes, in the manner of cinchona bark production in the heyday of the industry before the Eastern plantations got started.

It takes time and money to organize a cinchona industry, just as it does to organize rubber growing on a commercial scale. Immediate wartime needs probably will be met mainly out of the increased collection of wild cinchona bark, supplemented by what can be obtained from the remains of old plantations, such as "El Porvenir." But the important fact is that an extraordinary opportunity has arisen to give the industry a fresh start. Moreover, inter-American cooperation now aids the development of cinchona in this hemisphere. The new agricultural experiment stations organized in Central and South America through inter-American cooperation, along with the new Inter-American Institute of Agricultural Sciences, are participating in the work to establish cinchona in Latin America on durable foundations.

Science has learned much about cinchona, and its medical qualities, since the first package of bark was, according to one historical account, sent to the physician who attended the family of the Spanish Viceroy in Peru, the Count of Cinchon. Cinchona bark yields several distinct alkaloids. Studies of these alkaloids have revealed much knowledge about their respective qualities and values in medicine. Natural quinine, moreover, now has competition of synthetic products from the chemical laboratories, just as rubber does. This competition probably will influence prices in the future. Synthetic products opportunely have helped supply demand for anti-malarial drugs since the loss of the Netherlands East Indies. But there is no apparent reason, any more than there is in rubber, to assume that the chemist entirely has outmoded nature or that there is nothing left for the plant scientist to do in improving cinchona.

Germination of cinchona seeds at the Maryland station, for instance, shows that cinchona can be grown readily from seeds. Ben Y. Morrison, of the United States Department of Agriculture, says that fresh cinchona seeds can be germinated abundantly in 11 to 20 days if sown on a surface of sifted sphagnum in a hothouse where moisture can be preserved and temperatures kept constant. After germination the seedlings can be transplanted to nursery beds and, finally, to fields, the seedlings often flower in 2 to 3 years, depending upon the variety and the altitude. The harvest, however, usually does not begin until after the trees have been in the fields six years.

And plenty of work remains to be done in the improvement of cinchona species. Plant breeders can work toward three main objectives: (1) bark which yields a higher percentage of quinine; (2) trees which mature quickly; and (3) trees which will produce a larger quantity of bark. When all three of these objectives are attained in one type of tree, then plant breeders will have scored a real triumph. Inasmuch as cinchona is native to the Americas, the Western Hemisphere is a logical place to try for these objectives. Analysis of the bark of cinchona trees found in Latin America shows a quinine content ranging from zero to 17 per cent. The average is around 3 per cent against about 7 per cent for cinchona bark from Far Eastern plantations.

There are various species and types of cinchona trees, native to the Americas. Study and classification of these will aid the development of the cinchona industry in this hemisphere. Of the many alkaloids obtained from cinchona bark, quinine long has been the most important. But research indicates that other crystallizable alkaloids from the bark likewise may be found to be increasingly effective in the treatment of malaria. From the total of these alkaloids, an antimalarial drug known as totaquina was developed in the Philippines.

This is significant for the future of the cinchona industry in Latin America. Cinchona bark from Latin America generally has comparatively high percentage content of alkaloids other than quinine. The Java plantation bark, on the other hand, has relatively high quinine content. Consequently, greater use of alkaloids other than quinine would favor the development of cinchona in the Western Hemisphere. Less refining is required in obtaining alkaloids other than quinine. This presumably would help lower the cost of antimalarial drugs. It also would give the plant breeder incentive to

work for total alkaloid, rather than bark with high quinine content, as was done in the Far East.

Ordinarily an altitude of 3500 to 7000 feet is considered best for cinchona. These altitudes are the natural habitat of cinchona in South America. But there is at least one type of cinchona which grows at sea level. Cinchona, it seems, necessarily does not have to be restricted to the higher altitudes to yield the larger quinine content. This also points a goal for scientific research. Development of high-yielding cinchona for low levels would be welcome in the tropical Americas. The malaria menace exists chiefly in tropical lowlands. Quinine produced on the spot certainly would be handy for malaria-infested lowlands. Also, trees grow faster in the lowlands.

Already many devoted plant breeders and other specialists are working to establish cinchona in its native lands. These include Dr. Wilson Popenoe, director of the Pan American Agricultural School in Honduras; Atherton Lee, of the United Fruit Company; William Pennock, of the Foreign Economic Administration; Jorge M. Benitez and Fritz Rosengarten of Merck & Company and Lieutenant Claude Hope of the Foreign Economic Administration. Colonel Fischer and Mr. Morrison have had outstanding parts in bringing cinchona back to the New World for its wartime development.

Scientific research, in addition, may find new uses for quinine. At present all the quinine available is being used as an anti-malarial drug. But quinine also has found use in such diverse fields as hair tonic and the steel industry. These indicate that other uses might be found, especially if costs were lowered and supplies became more plentiful.

The most important use for quinine in this hemsiphere, as far as one can see ahead, is as an anti-malarial drug in tropical and subtropical areas. That is the compelling reason why the Americas must assure a continued supply. That is the reason, too, why quinine should be available at a low price. Agricultural workers of the other Americas generally have little cash income. They cannot afford to pay high prices for quinine. Abundant quinine, available to workers in tropical areas at low prices, could become one of the most beneficial contributions of American agriculture to the welfare of the American peoples. This makes the return of cinchona doubly welcome as a new crop for the tropical Americas.

PHARMACY IN THE SIXTIES

By George N. Malpass

PHILATELY, or the art and science of stamp collecting, has developed to the point at which there are specialists in many branches of postal history. One of the most interesting is a study of the war years of 1861-1865, and through this research many interesting facts have come to light. As an example, a general idea of pharmaceutical practice during the Sixties can be obtained from studying the letters and envelopes of Civil War days, especially those originating in the Southern States.

In 1861 the South was rich in cotton and other agricultural products, but manufacturing was not well developed. This was especially true in the paper industry, and most of the pre-war Southern stationery was imported from Europe and the Northern States.

When hostilities began the Confederate government seized the stocks of United States stamped envelopes and used them for official correspondence, printing right across each U. S. stamp to obliterate it. This was done in order to make use of the envelopes, as the shortage of paper was only too apparent right from the start.

Householders gradually used up all the envelopes they had, and then resorted to making their own. Genuinely used letter-covers were prepared from note paper, wrapping paper, wall paper, pages from accounting books, and any other suitable type available. Often paper that was plain on both sides was used twice by turning the envelope inside out after the first letter had been delivered.

Even druggists' circulars were used, and these give us an account of the pharmaceutical preparations in use at the time. Fig. 1A shows the outside of a home-made letter-cover cut from a wholesale drug house circular. It was postally used, and shows the common ten-cent stamp of 1863, with profile portrait of Jefferson Davis, President of the Confederate States of America. This is a beautiful specimen of a hand-made envelope, and is owned by the well-known Confederate specialist, Mr. Van Dyk MacBride, of Newark, N. J.

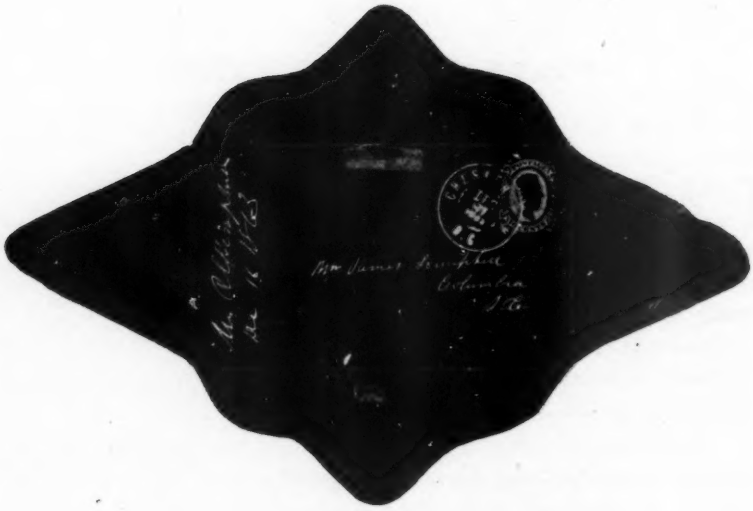


FIGURE 1A.

The inside of the envelope is shown in Fig. 1B. Part of the circular was cut away in making the envelope, but most of the products stocked are included in the illustration.

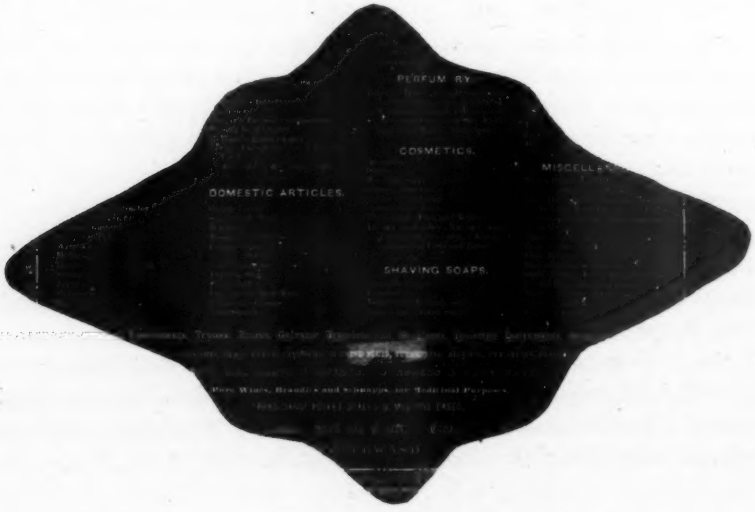


FIGURE 1B.

Among the nostrums are Essence Mustard, and the pills of Hooper, Wright, Moffat, Rose, Strong, Jayne, McLane, Holloway and Lee. We also find various Invigorators, Oils, and Bitters. Rodger's Tar and Canchalagua is also listed. The latter drug was derived from *Erythræa venusta* (*Gentianaceæ*) and was used as a bitter tonic and stomachic. In the same section are Balsam Wild Cherry, McMunn's Elixir Opium, and Syrup Phosphitus or Chemical Food.

In the column marked Domestic Articles are found many items which are still sold in retail stores. Cream of Tartar, Super Carb. Soda (forerunner of the super-duper suds type detergents), Washing Soda, Russia Isinglass, Cooper's Isinglass, Coxe's Gelatin, Tapioca Sago, Pearl Barley, Irish and Iceland Moss, Robinson's Groats, and Corn Starch.

The Perfumery department lists Lubin's, Harrison's, Peisse and Lubin's, and other celebrated Perfumes. Also French, German, and American Colognes, Bay Rum, Rose Water, and Frangipani.

Cosmetics are well represented by Amandine, Cold Cream, Rose Lip Salve, Chinese Mun-fun (today they would probably call it Sum-fun), Tablet of Alabaster, Spanish Lily White, Chalk Balls (pink and white), Lubin's and other Nursery and Toilet Powder. Also a fine assortment of puffs and boxes. It would seem that milady had no difficulty in preparing a synthetic complexion.

The gentlemen were not entirely out of the picture. Even though most men of the time needed mustache cups more than razors, we find several brands of shaving soaps listed. These are Roussel's Cream, Harrison's Cream, Walnut Oil Military Soap, Honey and French Soaps.

In the miscellaneous section appears a conglomerate of almost everything sold in drug stores of the day. Tooth powders and Pastes, Tooth Cordials and Washes, Brushes of all descriptions, Baking Powders, Concentrated Lye, Hair Mittens, Fine and Coarse Sponges, Combs of various materials, Knives, Scissors, Razors, Nursing Bottles and Cupping Glasses.

At the bottom of the sheet are the real specialties and more expensive items, displayed on seven lines, each one of which is printed in a different type, according to the custom of the times. Surgical Instruments, Trusses, Braces, Galvanic Braces and Necklaces, Injecting Instruments and Syringes are listed on the first line. The

second line is devoted to items now usually found in hardware stores —Oils, Varnishes, Glass, Putty, Camphene, Burning Fluid, Turpentine, Alcohol, Dye Stuffs, and Plaster of Paris. Then follows Gas Lamps and Shades, Congress and Soda Water; Pure Wines, Brandies and Schnapps, *for Medicinal Purposes* (just as they are used today, of course); Physicians' Pocket Scales and Medicine Cases; Tobacco, Snuff and Cigars, Cigar Cases and Whitewash Brushes. We pause to add "What, no alarm clocks, step-ins and fountain syrups?"

Fig. 2A shows the outside of an envelope made from a sheet of druggist's labels, just as they came from the printer. The envelope was postally used, and bears a pair of the typographed five-

FIGURE 2A.

cent Confederate stamps issued in 1862 and printed in Richmond. The cancellation was made by the postmaster, who wrote the name of the town (Mayesville, S. C.) across the envelope and the date over the stamps. This specimen is from the collection of the writer.

The inside of the envelope is shown in Fig. 2B, and it is an interesting example of the type of label used during the Sixties. The proprietor of the store was a physician, as shown on the label. Furthermore, the name of the town was evidently taken from the name of this prominent family. This was a common occurrence in the early days of town settlement.

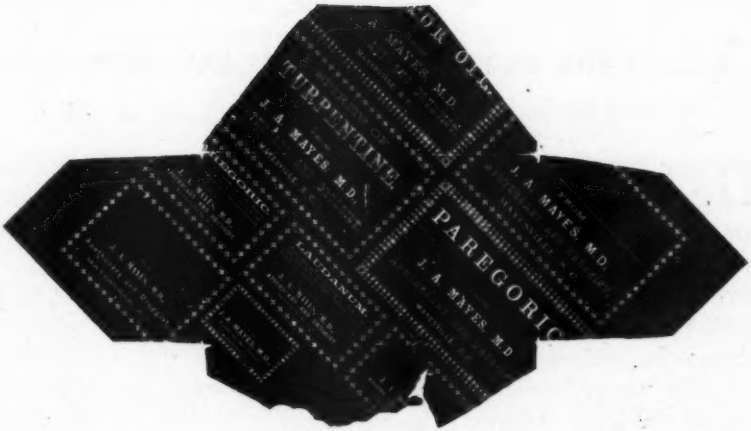


FIGURE 2B.

As to the labels themselves, one can see that they were of many sizes, and there were several different borders, in contrast to present-day practice of uniformity in size and design. Castor Oil, Paregoric, Turpentine and Laudanum all seemed to have their place. The directions for taking Paregoric are not exactly in accordance with legal requirements of today. They read "Relieves cough and promotes sleep. Dose to children 20 to 40 drops; adults 15 to 120. Taken in a cup of warm tea produces perspiration." Likewise the Laudanum label was not required to bear "the prescription legend," but reads as follows: "Eases pain and promotes sleep. Dose to an adult 20 to 60 drops. Paregoric is preferable for children." They really poured it in during those days, and such preparations were sold over the counter without legal restrictions. Our present dose is only one-fourth as large, and distribution is controlled by the Harrison Narcotic Act.

On reading the label carefully one is struck by the compound title of Apothecary and Druggist. Apparently there was a definite distinction at the time. The druggist was usually a wholesaler, and Dr. Mayes was a very versatile individual, being a physician as well. One could hardly blame him for recommending the Mayes Pharmacy to his patients.

And so these relics of the past not only provide collectors with material of philatelic value and interest, but add fragments of historical interest in many fields of endeavor, including pharmacy.

PLANS FOR NATIONAL FORMULARY REVISION

New Edition Expected to Be Ready Late in 1945

DELETION of nearly a third of the drugs in the National Formulary and acceptance of about 115 new monographs were among the extensive changes approved by the Committee on National Formulary at its three-day session held recently at the American Institute of Pharmacy, Washington, D. C. Developmental work on N. F. VIII is now under way, and the new edition is expected to be on the pharmacist's reference shelf by the end of 1945.

The use of English instead of Latin for primary drug titles was one of the basic changes of policy authorized. This action, which overthrows a long-standing tradition in pharmaceutical compendia, was taken as a step toward greater rationality in drug nomenclature and, in the opinion of the Committee, is in conformity with the trend of modern medical science and prescribing. Latin will be retained as the secondary title, appearing in smaller type and occupying the place of present English titles. The composition and nature of N. F. drugs will be indicated in the titles to the greatest extent possible. Drugs dispensed under N. F. synonyms must also meet the official standards.

Metric doses will be given greater emphasis in the new N. F. Consideration was given to a proposal to drop apothecaries' doses completely, but the Committee felt that the steady trend toward the use of the metric system had not yet reached the point where apothecaries' doses could be safely omitted from the monographs.

Discussion later centered on enteric coated medications, since some of those now being dispensed do not dissolve in the intestinal tract. Apparently standards will not be developed in time to include enteric coatings in the forthcoming revision but the Subcommittee on Solid Preparations for Internal Use is at work on the project.

Extension of another basic policy of the Committee will make N. F. VIII more self-contained, thus obviating the necessity of looking up information in the Pharmacopœia in connection with N. F. procedures.

Changes in formulas brought about by the exigencies of war will not be included in the regular revision. Instead they will be maintained on a temporary basis in a special supplement to be issued concurrently with N. F. VIII.

Recognizing the value of official standards to the practicing pharmacist as a means of providing dependable drugs and useful dispensing information, the Committee on National Formulary, composed of representatives of the nation's pharmacists, is inviting each state pharmaceutical association and individual pharmacists to participate in the revision work in an advisory capacity. Comments concerning the following list of deletions and admissions tentatively planned are invited:

Monographs Official in N. F. VII Which Will Not Be Included in N. F. VIII

Adonis
Aletris
Ammonium Hypophosphite
Apocynum
Artificial Carlsbad Salt
Artificial Vichy Salt
Artificial Kissingen Salt
Asarum
Berberis
Blue Flag
Bryonia
Cactus Grandiflorus
Calcium Creosotate
Calendula
Calumba
Camphorated Chloral
Camphorated Menthol
Castanea
Caulophyllum
Celery Fruit
Chimaphila
Chionanthus
Cocculus
Condurango
Convallaria
Corydalis
Cow's Milk
Crocus
Croton Oil
Damiana
Dental Liniment of Aconite and Iodine, Compound
Diluted Hydrocyanic Acid
Dioscorea
Echinacea
Effervescent Artificial Carlsbad Salt
Effervescent Artificial Kissingen Salt

Effervescent Artificial Vichy Salt
Effervescent Salts
Effervescent Salt of Lithium Citrate
Effervescent Salt of Magnesium Sulfate
Effervescent Salt of Potassium Bromide, Compound
Egg
Egg Yolk
Elixir of Bismuth
Elixir of Buchu
Elixir of Buchu and Potassium Acetate
Elixir of Buchu, Compound
Elixir of Calcium Lactophosphate
Elixir of Euphorbia, Compound
Elixir of Gentian and Iron
Elixir of Guarana and Celery
Elixir of Hydrangea and Lithium
Elixir of Hydrastis, Compound
Elixir of Pepsin and Bismuth
Elixir of Pepsin, Bismuth and Strychnine
Elixir of Phosphorus
Elixir of Viburnum Opulus, Compound
Emulsion of Cod Liver Oil with Egg
Emulsion of Cod Liver Oil with Hypophosphites
Ethereal Tinctures
Euonymus
Eupatorium
Euphorbia Pilulifera
Exsiccated Sodium Sulfate
Extract of Aloe
Extract of Gelsemium
Extract of Hydrastis
Extract of Sumbul
Extract of Taraxacum
Extract of Valerian
Fluidextract of Aletris
Fluidextract of Apocynum
Fluidextract of Berberis
Fluidextract of Buchu, Compound
Fluidextract of Calendula
Fluidextract of Calumba
Fluidextract of Castanea
Fluidextract of Caulophyllum
Fluidextract of Celery Fruit
Fluidextract of Chionanthus
Fluidextract of Condurango
Fluidextract of Convallaria
Fluidextract of Cotton Root Bark
Fluidextract of Cubeb
Fluidextract of Damiana
Fluidextract of Dioscorea
Fluidextract of Echinacea
Fluidextract of Euonymus
Fluidextract of Euphorbia Pilulifera
Fluidextract of Frangula
Fluidextract of Guarana
Fluidextract of Humulus
Fluidextract of Hydrangea
Fluidextract of Jalap
Fluidextract of Juniper
Fluidextract of Kola

Fluidextract of Krameria
Fluidextract of Lappa
Fluidextract of Leptandra
Fluidextract of Oat
Fluidextract of Phytolacca
Fluidextract of Quassia
Fluidextract of Rhamnus Cathartica
Fluidextract of Rose
Fluidextract of Sanguinaria
Fluidextract of Sarsaparilla, Compound
Fluidextract of Serpentaria
Fluidextract of Stillingia
Fluidextract of Trifolium
Fluidextract of Trillium
Fluidextract of Viburnum Opulus
Fluidextract of Xanthoxylum
Fluidglycerates
Frangula
Gallic Acid
Glycerite of Bismuth
Glycerite of Egg Yolk
Glycerite of Pepsin
Guaiacol Carbonate
Guarana
Honey of Rose and Sodium Borate
Helonias
Humulus
Hydrangea
Infusion of Gentian, Compound
Infusion of Senna with Magnesium Sulfate
Iodine Petroxolin
Kola
Krameria
Lappa
Liquid Petroxolin
Lithium Benzoate
Lithium Carbonate
Lithium Citrate
Lithium Salicylate
Lupulin
Manna
Mitchella
Monobromated Camphor
Oat
Oil-Sugars
Ointment of Mustard
Ointment of Potassium Iodide
Ointment of Zinc Stearate
Orris
Pills of Aloe and Myrrh
Pills of Ferrous Iodide
Pills of Iron, Quinine, Strychnine and Arsenic
Pills of Rhubarb and Aloe
Phosphorated Oil
Phytolacca
Plaster of Cantharides
Potassium Sulfate
Powder of Pancreatin, Compound
Pulsatilla

Rhamnus Cathartica
Saccharated Ferric Oxide
Sambucus
Scutellaria
Soluble Ferric Pyrophosphate
Solution of Peptonized Iron
Spirits of Volatile Oils
Stillingia
Styptic Collodion
Sumbul
Suppositories of Boroglycerin
Syrup of Ammonium Hypophosphite
Syrup of Asarum, Compound
Syrup of Calcium Lactophosphate
Tincture of Aloe and Myrrh
Tincture of Antimony
Tincture of Bryonia
Tincture of Cactus Grandiflorus
Tincture of Calendula
Tincture of Calumba
Tincture of Capsicum and Myrrh
Tincture of Cimicifuga
Tincture of Cocculus
Tincture of Cubeb
Tincture of Guaiac
Tincture of Jalap
Tincture of Pulsatilla
Tincture of Quassia
Tincture of Quillaja
Tincture of Sanguinaria
Tincture of Serpentaria
Tincture of Squill
Tincture of Viburnum, Compound
Tinctures of Fresh Drugs
Trifolium
Trillium
Troches of Elm
Viburnum Opulus
White Sandalwood
Xanthoxylum
Xanthoxylum Fruit

New Monographs Which May Be Included in N. F. VIII

Acetylaminohydroxyphenylarsonic Acid (Acetarsone, Stovarsol)
Acetylcholine Hydrobromide
Allantoin
Aluminum Citrate
Ampuls of Acetylcholine Hydrobromide
Ampuls of Calcium Levulinate
Ampuls of Indigo Carmine
Ampuls of Iron Arsenite
Ampuls of Iron Cacodylate
Ampuls of Sodium and Gold Thiosulfate
Ampuls of Sodium-Antimony III *bis*-catechol-2,4 disulfonate
(Ampuls of Fuadin, Ampuls of Stibophen)
Ampuls of Sodium Thioglycollate

Antimony Sodium Thioglycollate
Barium Chloride
Benzyl Alcohol
Butyl Aminobenzoate Picrate (Butesin Picrate)
Calcium Levulinate
Capsules of Castor Oil
Capsules of Ephedrine
Capsules of Ephedrine + a hypnotic
Capsules of Phenacetin, Aspirin and Caffeine
Capsules of Quinine Sulfate
Capsules of Reduced Iron
Capsules of Saccharated Ferrous Carbonate
Capsules of Stramonium
Capsules of Theophylline with Sodium Acetate
Cetyl Alcohol
Chlorophyll
5-Chloro-7-iodo-8-hydroxyquinoline (Vioform)
Cinnamomum Zeylanicum
Coal Tar, Colorless
Coconut Oil
Colloidal Silver Chloride (Lunosol)
Colloidal Silver Iodide (Neo-Silvol)
Curare
Dioctyl Sodium Sulfosuccinate (Aerosol O. T.)
Elixir of Aminoacetic Acid
Elixir of Ferrous Sulfate
Elixir of Pentobarbital
Elixir of Thiamine Hydrochloride
Emulsion of Pine Oil
Extract of Sheep Bile
Ferrous Ascorbate
Ferrous Gluconate
Glyceryl Monostearate
Gutta Percha
Histidine Hydrochloride
Homatropine Methylbromide (Novatropine)
Indigo Carmine
Iodized Lime (Calcidin)
Iron Arsenite
Iron Cacodylate
Jelly of Allantoin
Jelly of Gentian Violet
Lotion of Rotenone
Mercuric Cyanide
Methyl Cellulose
Methyl Chloride
Morphine Tartrate
4-Nitro-3-hydroxy-mercuri-*ortho* cresol anhydride (Metaphen)
Nutgall
Ointment Base, Hydrophilic
Ointment of Allantoin
Ointment of Butyl Aminobenzoate Picrate (Ointment of Butesin Picrate)
Ointment of Chlorophyll
Ointment of Coal Tar, Colorless
Ointment of Nutgall
Ointment of Pyrethrum Flowers
Oleyl Alcohol
Ophthalmic Ointment of 4-Nitro-3-hydroxy-mercuri-*ortho* cresol anhydride (Ophthalmic Ointment of Metaphen)

Papain
Phenyl Mercuric Chloride
Phenyl Mercuric Nitrate
Phenyl Mercuric Picrate (Merphenyl Picrate)
Pine Oil
Proflavine Sulfate or Chloride
Propylene Glycol
Pyrethrum Flowers
Resorcinol Monoacetate
Rotenone
Rubbing Alcohol
Sippy Powders
Sodium Alginate
Sodium and Gold Thiosulfate
Sodium-Antimony III *bis*-catechol-2,4 disulfonate (Fuadin, Stibophen)
Sodium Lauryl Sulfate
Sodium Propionate
Solution of Aluminum Citrate
Solution of *4*-Nitro-*3*-hydroxy-mercuri-*ortho* cresol anhydride (Solution of Metaphen)
Solution of Phenyl Mercuric Nitrate
Stearyl Alcohol
Sterculia Gum
Sulfonated Hydrogenated Castor Oil
p-Sulfonedichloramidobenzoic Acid (Halazone)
Sun Tan Ointment
Tablets of Acetylaminohydroxyarsonic Acid (Tablets of Acetarsone, Tablets of Stovarsol)
Tablets of Arecoline Hydrobromide
Tablets of Barium Chloride
Tablets of Calcium Gluconate
Tablets of Carbarsone
Tablets of *5*-Chloro-*7*-iodo-*8*-hydroxyquinoline (Tablets of Vioform)
Tablets of Homatropine Methylbromide (Tablets of Novatropine)
Tablets of Iodized Lime (Tablets of Calcidin)
Tablets of Magnesium Hydroxide
Tablets of Pilocarpine Nitrate
Tablets of Potassium Bromide
Tablets of Santonin
Tablets of Sippy Powders
Tablets of Sodium Chloride
Tablets of Sodium Chloride with Dextrose
Tablets of *p*-Sulfonedichloramidobenzoic Acid (Tablets of Halazone)
Tincture of *4*-Nitro-*3*-hydroxy-mercuri-*ortho* cresol anhydride (Tincture of Metaphen)
Titanium Dioxide
Triethanolamine
Troches of Iodized Lime (Troches of Calcidin)

THE GREEKS HAD A WORD FOR IT

By John E. Kramer, B. Sc.

FROM the seventh century B. C. to the third century A. D., the Greek philosophers, theosophers, and other "osophers" meditated heavily and investigated lightly into the mysteries of the world in general and nature in particular. All the scientific theories and facts of preceding ages filtered through the minds of the Greeks, some of them to emerge in new forms, and others with renewed sponsorship.

Greece was a learned nation, analyzing, organizing and seemingly subsidizing scientific knowledge. From the mythology of the early Greeks, to the more often correct astronomy, geometry, physiology and logic of the later seekers after wisdom, we find the race playing a most important part in the history of science. And all made possible by the splendid geographical location of the country, its ideal place in the history of the world and its people's natural tendency to culture and their habit of endeavoring to reason through every natural phenomenon.

Many were the theories advanced, and most of them were true, within their limitations. Others were wrong, even foolishly wrong in the light of modern knowledge. For instance, Empedocles' doctrine of only four elements—earth, air, fire and water, and Aristotle's definition of matter as "that which has neither substance, nor extension, nor quality, nor any other species of existence." Yet even these false conclusions started further investigations leading to the true facts.

The Romans, who followed the Greeks as world leaders, were not at all scientifically inclined, therefore science declined for many years after the passing of the Grecian philosophers. Further, in 290 A. D., there was an official decree that all works in alchemy be destroyed so that no person would become rich through possible discovery of the great unknown method of changing baser metals to gold.

Passing by the discountable and later discounted hypotheses, let us list some of the theories and findings of the Greek philosophers that are with us yet—withstanding the ravages of time, and as true

today as when they were propounded. It can be seen that the Greeks *had* a word for it.

Astronomy. Pythagorus (580-500 B. C.) determined to his own satisfaction that the earth revolved around the sun, and Aristarchus, somewhere about 265 B. C., propounded the theory that the earth makes a daily revolution, relieving the sun of the onerous task of beating its way across the heavens once every 24 hours. He also stated with quite some conviction that the sun itself was luminous and the moon and the planets and the stars reflected the light from this great body. How different from the mythology of previous days.

Hipparchus (161-126 B. C.) was an astronomer who spent months of his time gazing heavenward, and finally devised a catalogue of 1000 of the fixed stars.

Atoms. Democritus (495-435 B. C.) was the first to propose a theory of particles of matter so small as to be further indivisible. The word atom is itself derived from the Greek for indivisible. Democritus' proposition, however, did not meet with great or lasting acclaim, and it lay dormant for many years until revived by Epicurus (341-270 B. C.) in the rise of chemistry as a true science.

Botany. Theophrastus (370-288 B. C.), in his nature studies, came to the conclusion that there was some definite order in the plant kingdom, and divided all plants into three general groups—shrubs, herbs and trees. Thus was the science of botany augmented, if not inaugurated, by the famous Greek.

Circumference of the Earth. The feat of determining the distance around the earth was first attempted by Eratosthenes (276-194 B. C.), whose calculations gave the answer as 28,700 miles. Even though this is not the correct figure, Eratosthenes' efforts deserve commendations and recognition.

Dyestuffs. The modern era of organic dyes was anteceded by the purple dyestuffs, and many other colors, too, mentioned in the

Leyden Papyrus of about 290 A. D. Later the purple of the Romans was the color of royalty.

Eclipses. These natural phenomena were observed, studied and pondered over by Thales (624-560 B. C.), who finally became so proficient that he was able to predict an eclipse in 585 B. C. Thales was also an authority on the whys and wherefores of solstices and equinoxes, and their prognostication.

Evolution. The preamble of this article quoted Aristotle's definition of matter, yet his very ideas on the being and existence of matter, and his view that change was always and everywhere in effect are forerunners of our contemporary thoughts on evolution. Aristotle was firm in the belief that change always had been and always would be taking place.

Fossils. Pythagorus was probably the first to broach the statement that fossils were the ossified remnants of long-buried animals and plants. Even in the long ago days of the Greeks, the world was evidently old and worn, and showing its age every time a fossil was unearthed.

Materia Medica. This ever progressive science which treats of the substances used in medicine had, as one of its earliest text books, Dioscorides' "De Materia Medica," written in the first century A. D. This work was the criterion for many hundred years, and, even though some of Dioscorides' teachings have been refuted in the light of modern work, some of his conclusions are still good today.

Medicine. The early history of medicine is inseparably connected with the name of Hippocrates (460-375 B. C.), familiarly and respectfully known as the Father of Medicine. His theories and practices in the healing art mark the divorce of the true science of medicine from mythology, magic, religious fanaticism and superstition. Instead of beseeching the gods to deliver the patient from an illness, or resorting to popular hocus-pocus methods, Hippocrates

made careful, thorough and systematic examinations and diagnoses, and acted according to his findings. As an observer and writer on disease, he had no equal in his day.

Museums. The now widespread fashion of natural history museums and botanical gardens was inaugurated by Aristotle (384-322 B. C.) and carried on by Theophrastus (370-288 B. C.).

Phases of the Moon. Much to the delight of the lovers and the superstitious of his time, Anaximander (611-547 B. C.) studied and was able to predict the phases of the moon, which had, before that time, been more or less of a heavenly mystery.

Specific Gravity. Archimedes, of "Eureka in the bathtub" fame, propounded the facts of specific gravity, and made an expose of a deceitful goldsmith by the water displacement method.

Theatre. The Greeks are noteworthy in the history of the theatre, thanks to the tragedian Æschylus (526-455 B. C.), who wrote more than 80 plays and who introduced the great forward step of having two actors instead of one in each play.

Vacuum. Aristotle was firm in his belief that "space is full" and that nature contains no void. Today we have the maxim that "nature abhors a vacuum."

Volcanoes. In the fifth century B. C., Pythagorus, famous in the field of geometry, stated that he believed volcanoes to be nothing more than safety valves for underground fires, and not, as had been thought, the results of the anger of the gods.

SELECTED ABSTRACTS

I. Dried Plasma Sheets in Treatment of Burns. II. In Treatment of War Wounds. B. Pollack. *U. S. Nav. Med. Bull. 42,* 1171 (1944). To prepare a transparent, slightly elastic, adherent coagulum for burns or for the treatment of indolent, ulcerating war wounds, from 1.5 to 2 gm. of dried plasma are dissolved in 20 cc. of sterile water in a Petri dish about 4 inches in diameter, after which 0.2 gm. of sulfanilamide powder is added. The preparation is dried in an oven at 140° C. for 15 to 20 minutes until a firm sheet forms. After cooling, the sheet is applied directly to the burned area after debridement, or to the wound. Plasma loss from a burn is immediately stopped.

The plasma sheet appears to have a selective action, since it adheres readily in second and third degree burns but not to unbroken skin. The patient notes a burning or stinging sensation when the plasma sheet is applied; this usually lasts only one or two minutes, but may continue as long as 30 minutes. It is not necessary to apply a dressing over the sheet.

Plasma sheets may be preserved for a period of weeks by keeping them moistened with water in a refrigerator. Another method is to heat the preparation until it has been completely deprived of moisture, leaving crisp, dry sheets which may be stored without refrigeration.

Four case reports are presented in which plasma sheets were used with marked success after other treatment for two months had yielded unsatisfactory results.

Present Status of Penicillin. G. F. Schmitt. *U. S. Nav. Med. Bull. 42,* 1047 (1944). The author reviews the data compiled on this antibiotic agent, describing its production, purification, physical and chemical characteristics, method of assay, administration, therapeutics, mechanism of action, and toxic reactions.

The medium used for the growth of the mold is neutral in reaction at the start, but by the end of the third day the pH becomes 3,

rising to pH 5-6 by the time the green color of the mold appears. As the color of the mycelium fades, the pH reaches 8; the production of penicillin is at the maximum near the neutral point.

The extraction of penicillin from the crude substrate of the culture media is difficult. This solution is acidified, filtered, dissolved in an organic solvent at pH 2, and then treated with an aqueous diluent at pH 6-7. Numerous repetitions of this procedure, followed by treatment with animal charcoal, remove some of the impurities. The purification process is completed by repeated chromatographic adsorption upon alumina, with elution by phosphate buffer and extraction with amyl acetate. From this solvent penicillin is extracted as the yellow-colored barium salt by treatment with barium hydroxide, followed by drying by the lyophile process.

Penicillin has been obtained as the free acid, and in the form of its barium, sodium, potassium, ammonium, calcium, and strontium salts. All of these are hygroscopic and rapidly lose their activity upon exposure to air; all are soluble in both aqueous and organic solvents. Penicillin withstands heating for one hour at 56° C., but autoclaving it for fifteen minutes at 115° C. completely destroys it. The empirical formula $C_{24}H_{32}O_{10}N_2Ba$ or $C_{23}H_{30}O_9N_2Ba$ has been suggested for the barium salt, but no structural formula has been advanced.

For the assay of penicillin the technic most easily performed is the serial dilution method using broth cultures of hemolytic streptococci, with erythrocytes added as an indicator. However, agar plates implanted with staphylococci may be used instead. Tubes containing, respectively, a standard penicillin solution of known strength and the unknown are serially diluted in the broth or agar and are incubated for 24 hours. The tubes are then assayed for hemolysis, or the plates are studied for bacterial inhibition. For this assay, the unit is defined as that amount of penicillin which, when dissolved in 50 cc. of meat extract broth, completely inhibits the growth of a test strain of *Staphylococcus aureus*. Expressed differently, the meat extract broth which contains one unit per mg. just inhibits the growth of *S. aureus* in a dilution of 1:50,000.

In the Oxford cup method of assay small vessels containing penicillin are implanted in nutrient agar seeded with *S. aureus*. The plates are incubated for 12 to 16 hours at 37° C., and the zone of bacterial inhibition surrounding the cylinders is measured. A Florey

or Oxford unit produces an average zone of 24 mm. This unit does not apply for the serial dilution method.

Among the substances related to penicillin are notatin, penicillin B, and penatin; some authors consider the latter three to be identical. Other substances which have been isolated from cultures of *Penicillium notatum* are penicidin, penillic acid and pencillamine.

A tabulation compiled by other investigators of the organisms which are susceptible or unsusceptible to penicillin is presented. Penicillin is bacteriostatic, but under certain conditions it may be bactericidal. Its action differs from other therapeutic agents in that it is not a detergent, is not hemolytic, and is unaffected by the presence of pus, products of tissue destruction, or large numbers of bacteria. Erythrocytes and plasma do not inhibit its action.

It has been determined that to attain bacteriostatic effects against hemolytic streptococci, a penicillin concentration of 0.019 to 0.156 units per cc. of blood serum is necessary; against *S. aureus,* a concentration of 0.156 Florey unit is required. A suitable level is maintained better by the frequent injection of small amounts of the drug than by larger doses at greater intervals.

Toxic reactions which have been attributed to penicillin include (1) urticaria in 5 per cent of the cases, frequently accompanied by fever, eosinophilia, and abdominal cramps; (2) fever in afebrile patients; (3) transient azotemia; and (4) thrombophlebitis. Numerous other manifestations are believed to be caused by impurities present in the drug.

The drug is not administered by mouth since it is inactivated by the hydrochloric acid (not the pepsin) of the stomach. The parenteral route of choice is the continuous intravenous method, although intermittent intravenous and intramuscular injections are also used. It has been shown that the drug is slowly absorbed after subcutaneous injection, and that the concentration does not reach the levels obtainable by intravenous or intramuscular administration. The exact concentration and quantity of penicillin solution to be given intraspinally has not been established. The drug may be used locally, supplemented by parenteral administration.

The therapeutic uses of the drug are briefly discussed. Fifty-five references to the literature are cited.

The Chemistry and Pharmacology of Sulfonamide Drugs. J. C. Krantz, Jr. *J. A. D. A. 31,* 634 (1944). Prefacing his review of the sulfonamides with a brief picture of man's conquest of disease, the author describes the contributions to medical knowledge made by Leeuwenhoek, Semmelweis, Lister, Holmes, Livingstone, and Ehrlich. In more recent times came the work of Young, White and Hill on mercurochrome, the observations of Johnson which led to the preparation of hexylresorcinol, and the experiments of Domagk on prontosil.

The material presented on the chemistry and pharmacology of the sulfonamides is of the nature of a brief and only partially complete survey. The drugs considered are sulfanilamide, sulfapryidine, sulfathiazole, sulfadiazine, and sulfaguanidine.

Root-Canal Therapy and the Use of Sulfonamides. N. Rosen. *J. A. D. A. 31,* 622 (1944). Chemotherapy in root-canal treatment must be preceded by proper instrumentation, as well as to complete the treatment by the correct filling of the canal. The author uses the sulfonamides (1) whenever infection of the pulp or periapical area is suspected and (2) only when these drugs can be applied so as to come in contact with tissue fluid.

Solutions of sulfanilamide and sulfadiazine are used as irrigants. The former is soluble in water to the extent of 1.46 per cent at body temperature, and its solubility is increased to more than 6 per cent at 60° C., at which temperature it is applied; if it is injected locally, 1.97 per cent is soluble in human serum at body temperature. Sulfadiazine is used in a strength of 2.5 per cent, with 8 per cent triethanolamine as solvent; such a solution has a pH of about 8.7, is not toxic, and is readily absorbed by the tissue. The sulfadiazine solution is heated before it is used.

Sulfathiazole may be applied as a powder or made into a paste with glycerin and mixed with the purulent exudate in the root-canal.

In order to determine when the canal is ready for filling bacteriologic examination is employed; the culture method is more precise for this purpose than the smear. It is still debatable, however, whether absolute sterility is possible or necessary before a canal may be filled.

It was found that when purulent and acutely infected teeth were treated by the application of eugenol, beechwood creosote, cresatin and triformocreosol, or by electrosterilization, a dozen or more treatments were necessary before a negative culture could be obtained. The use of the sulfonamides reduced the number of such treatments in practically all cases by at least one-half. The author still uses the drugs mentioned above in conjunction with sulfonamide therapy because of tissue tolerance of repeated applications of these same drugs, and because some of these orthodox medicaments assist in the elimination of the products of protein hydrolysis, thereby enhancing the action of the sulfonamides.

Thymol in Cavity Sterilization. H. W. Day. *J. A. D. A. 31,* 605 (1944). The effectiveness of melted thymol instilled into carious teeth to sterilize the area was studied in three phases: (1) the bacteria present were isolated by a culturing technic; (2) a phenol coefficient for thymol was established, using pure cultures from caries; (3) the actual penetration of thymol in the infected dentin was determined by use of X-ray films.

Most of the organisms present were found to be closely related to, if not identical with, *Lactobacillus acidophilus.*

Thymol was found to be 23.4 times more powerful than phenol as a germicide against the lactobacillus, and it has the additional advantages of not possessing a self-limiting action, of being non-caustic, and of producing no discoloration. Thymol was applied to carious teeth by warming the tips of a pair of cotton forceps, holding them together, and dipping them into a quantity of the crystals. The melted thymol was then transferred to the cavity under treatment.

Although it was found that there is a limit to the area of decay that can be sterilized by the application of thymol, the bacteriologic studies of the penetration of the drug indicated a definite sterilization in the presence of gross amounts of decay. Thus, if it appears from the examination of X-ray films, though not clinically, that there is a probable pulp involvement, small areas of decay can be left near the pulp and sterilized with thymol without injury to the odontoblastic layer, thus aiding the regeneration of secondary dentin.

Influence of Vitamin C on Wassermann-Fastness in Syphilis. S. L. Ruskin. *Am. J. Digest. Dis. 10,* 170 (1943); through *U. S. Nav. Med. Bull. 42,* 1038 (1944). Vitamin C is reported to enhance the spirocheticidal effect of bismuth and the trypanosomicidal effect of antimony, apparently by influencing the capacity of these organisms to take up the metal. The action of arsenic and of gold likewise seems favored in the presence of this vitamin.

A study of ten syphilitics who had a Wassermann-fast positive condition revealed that seven became Wassermann-negative through the use of bismuth cevitamate.

Application of Dicoumarin (3, 3'-methylene-bis-[4- hydroxy-coumarin]) in Trauma and Gangrene. C. E. Brambel and F. F. Loker. *Arch. Surg. 48,* 16 (1944); through *U. S. Nav. Med. Bull. 42,* 1024 (1944). During the administration of dicoumarin careful study of the coagulative properties of the blood should be made since great variability in response has been observed.

Following the oral administration of the drug, a period of twenty-four to forty-eight hours elapses before any change in the coagulation properties of the blood is apparent. If immediate disruption of the clotting mechanism is indicated, heparin must be used instead, since the response to it is obtained within one hour. The two drugs may be used simultaneously since they do not counteract each other and each has a different mode of action. Heparin inhibits thromboplastin, thus forestalling clotting; dicoumarin is believed to exert its effect on the prothrombin-producing organs, with the result that a prothrombin deficiency develops consequent to the inhibition of blood clotting.

SOLID EXTRACTS

For many years the standard diet for tubercular patients has been milk and eggs. Now, however, an expert declares that fare obsolete, and states that ordinary food can be supplemented with vitamins and serve the same purpose in much better fashion. At the same time, he rules out the custom of having victims of the pulmonary type of tuberculosis sit in the sun, as, he says, it causes fever and restlessness.

AJP

A recent note in the Journal of the American Medical Association calls attention to medical studies which would indicate that bleeding may occur after the taking of large and continued doses of salicylates and, particularly, aspirin. It was suggested that patients requiring such medication should be watched carefully so that vitamin K may be given to counteract such untoward results if necessary.

Even though aspirin is one of the most widely used drugs, it is not usually taken in exceedingly large doses and over long periods of time except under medical supervision. Accordingly, the apprehensions voiced by the public press upon receipt of the notice of these medical studies seems quite groundless.

AJP

In the news of the day we read that the War Production Board has prohibited the use of war-scarce manila hemp for executions. But let there be no worry, for a report from Haiti tells us that 15,000 acres there have been planted in sisal, from which excellent rope may be manufactured.

AJP

Dreaded epileptic convulsions are caused by impaired circulation due, according to Dr. Temple Fay, to "an infantile heart and chest in a normal body." He advises exercises to develop the lungs during youth, and the use of CO_2 in the treatment of seizures.

Insurance statistics reveal that there was only a slight increase in the mortality rate during 1943, and that only one-fourth of this increase was due to war factors.

Tuberculosis and childbirth reached new lows as causes of death, and infant mortality also reached its lowest ebb, despite the continued rise in the birth rate. Increases in death rate were found in diseases of the heart, arteries and kidneys, cerebral meningitis, influenza and pneumonia.

Over the past three decades life expectancy in the United States has increased from 53 to 64 years.

AJP

A new substance for preventing the development of rancidity has been announced. It is nor-dehydro-quaiaretic acid abbreviated N. D. G. A. It is obtained from the creosote bush Larrea Divaricata which grows in semi-arid regions of the United States. In purified form it is a white crystalline substance. It is non-toxic and is already being used in preserving fatty foods for use by the armed services.

AJP

Eczema in infants and young children may be caused by dandruff from parents or others according to a recent report. Twenty subjects with eczema were tested by a patch test, resulting in 15 positive reactions. Measures to eliminate all contact with human dandruff promptly results in improvement in most cases.

AJP

Tonsillectomy, once almost as common in children as baptism is becoming less and less popular with the medical profession. Now we learn that, during a poliomyelitis epidemic, the removal of the tonsils would appear to increase the likelihood of the bulbar type of this disease which is one of the most serious forms. Physicians are now advised to avoid tonsillectomies during times when poliomyelitis is prevalent.

AJP

Ergotamine Tartrate has been recommended as a useful drug in treating physical reactions to convoy fatigue. It appears to have a very real value in treating the mental trauma occasioned by continued strain of battle or other instances where great emotional disturbance has produced damage to the mental condition of the individual.

BOOK REVIEW

Medical Physics. Edited by Otto Glasser, Ph. D. The Year Book Publishers, Inc., Chicago, Ill., March, 1944. 1744 pp., 19 × 26.7 cm., 1382 illustrations. Price: $18.00.

"Medical Physics," for the first time in any language, places between the covers of a single book, a wealth of material pertaining to the most recent and modern developments of the Science of Physics as applied to the Science of Medicine.

This book combines the qualities of an encyclopedia, a textbook, and a reference book all into one. The subjects covered are listed in alphabetical order and run from "Air Conditioning" to "Weighing." It is copiously illustrated (1382 illustrations) with photographic reproductions, drawings, sketches, charts, and graphs. There are 255 topics written by 245 authors who are recognized authorities in their respective fields.

The editor-in-chief, Dr. Otto Glasser, who is Head of the Department of Biophysics of the Cleveland Clinic Foundation, has selected a very able and capable staff of Associate Editors (22), and Assistant Editors (245). Among these might be mentioned Otto Rahn (Bacteriology), William D. Coolidge (X-Rays), Robley D. Evans (Nuclear Physics), Chevalier Jackson (Bronchoscopy), George W. Binkley (Dermatology), and Vladimir K. Zworykin (Electron Microscope).

The topics are described in a concise, yet thorough and understandable manner. They represent important developments in the field of Physics which are applicable to the field of Medicine. Complicated mathematical formulæ are generally omitted, and anyone who has had a good course in College Physics should not find it difficult to follow the line of thought. Glancing through the book one finds described, among the 255 topics, the following recent developments of Physics, some of which are too new to be in the textbooks: the Betatron, Bioelectricity, the Cyclotron, the Electron Microscope, Geiger-Muller Counters, Artificial Radioactivity, Neutrons, and Electron Multipliers.

Take the example of the Betatron. This topic is written by Dr. Donald W. Kerst, who is responsible for designing the original apparatus, and is the one who put it into operation. In addition to a description of the instrument, its operation, and some of its biological effects, there is a photograph of the apparatus, diagrams to show how it works, and graphs of some of the biological results obtained with it.

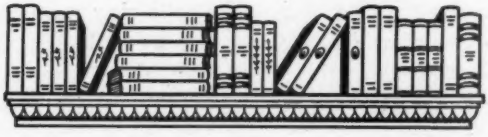
One also finds a description of some of the most recent discoveries in the older fields of Physics which are applicable to Medicine, such as X-Rays, Spectroscopy, Centrifugation, Color Vision, Electrocardiography, Optics, Photoelectricity, Photography, and Vacuum Technique.

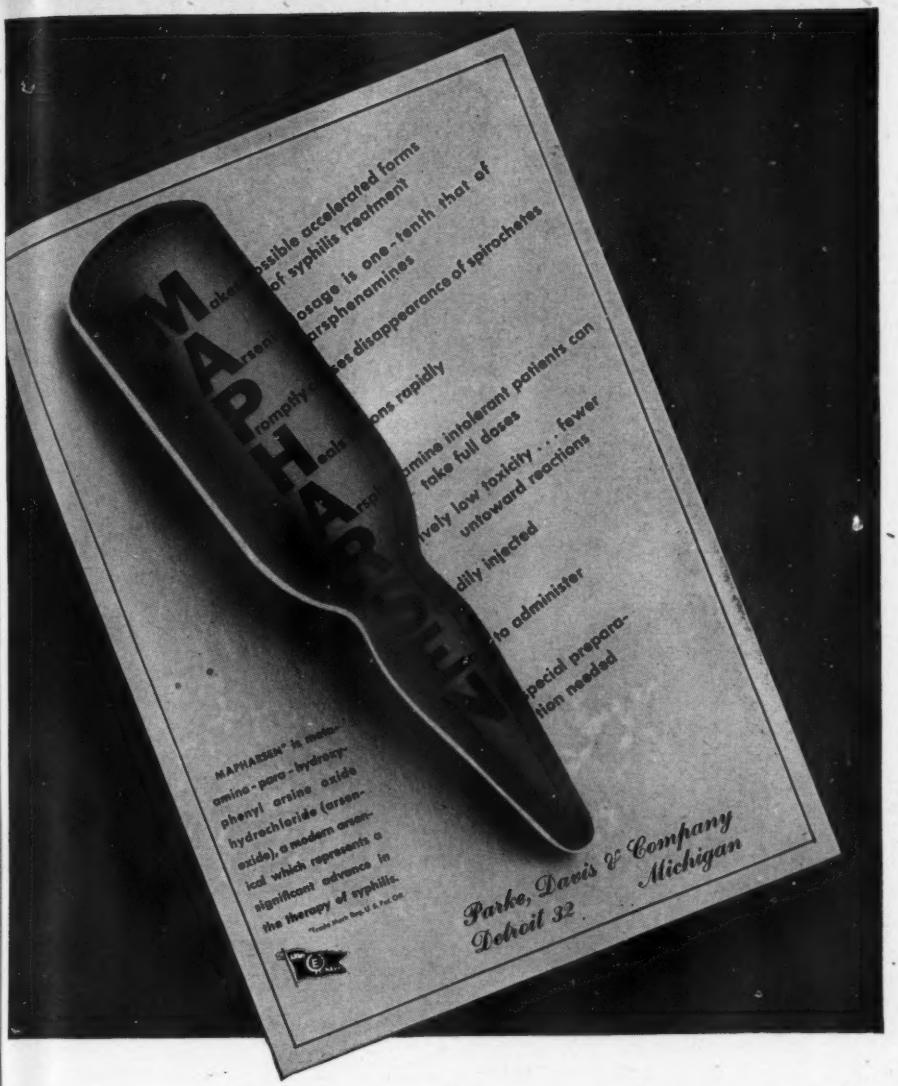
If we take as an example of this group the general topic of X-Rays (called Roentgen Rays in the book), we find that it is broken down into sub-topics such as the following: Tubes (including the new million volt tubes), Circuits, Biological Effects, Chemical Effects, Cinematography, Diffraction, Absorption, Protection, and Therapy. Each sub-topic is thoroughly treated, with a description of the most recent developments included, written by an author who is an authority in this field.

The book "Medical Physics" is a recognition of the growing importance of Physics to the field of Medicine. It is a book which everyone connected with the Medical Profession such as Clinicians, Chemists, Biologists, Bacteriologists, Pharmacists, and Physiologists, as well as the practicing and specializing Medico, should have readily available. Every academic, public, and industrial library should have a copy of this book on its reference shelf.

It is undoubtedly the best book which has appeared thus far on the Scientific horizon, which shows the relation between the two great Sciences of Physics and Medicine.

DONALD P. LEGALLEY.





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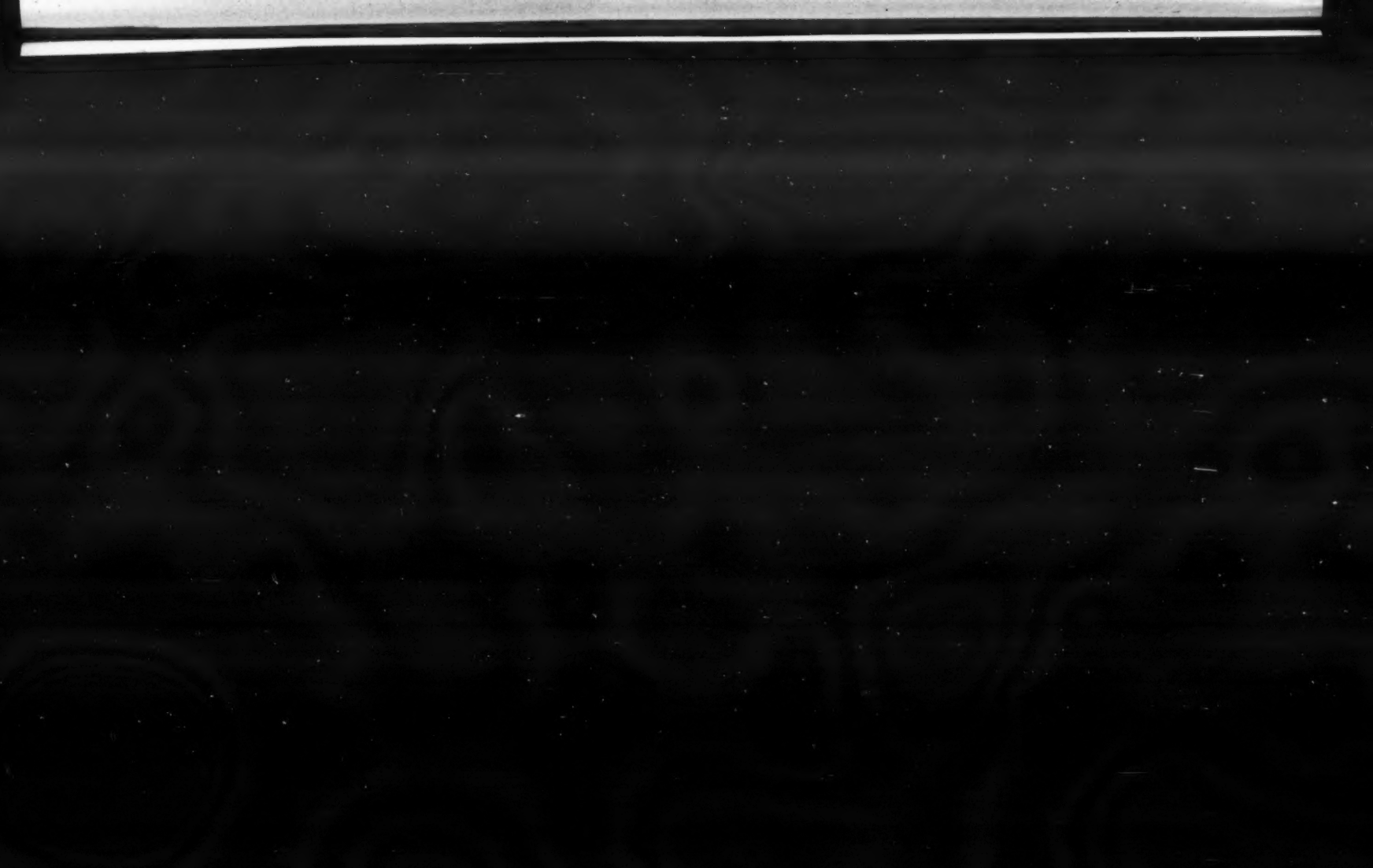

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